



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering

Level: Diploma

Branch: Textile Manufacturing Technology

Course / Subject Code : DI03029061

Course / Subject Name : Apparel Manufacturing Technology

| | |
|--------------------------------|---------------------------|
| w. e. f. Academic Year: | 2024-25 |
| Semester: | 3 rd |
| Category of the Course: | Professional Core Courses |

| | |
|----------------------|--|
| Prerequisite: | Basic knowledge of Yarn and Fabric manufacturing. |
| Rationale: | <p>Apparel manufacturing is one of the key domains within the textile industry. In recent years, the demand for ready-made garments (RMG) has increased rapidly due to their advantages such as economical pricing, high production rates, reduced waste generation, and bulk production capabilities. To meet this growing demand, students must acquire comprehensive knowledge of the apparel manufacturing process. This course is designed to provide an in-depth understanding of the individual steps involved in apparel production from fabric selection to the final packaging of finished garments. Students will develop essential skills in proper fabric selection, efficient marker planning to minimize material waste, and the appropriate choice of stitches, seams, sewing needles, threads, and sewing machines. Emphasis is also placed on setting the correct operation sequence and managing material handling effectively. With the advancement of modernization, automation, and digital technology, computer-based systems are now an integral part of the apparel industry. These systems enhance productivity by saving time, reducing manual effort, and lowering production costs. Accordingly, the course includes computer-controlled processes such as grading, marker planning, fabric spreading, and cutting, along with the application of Computer-Aided Design (CAD) and Computer-Aided Manufacturing (CAM) technologies in garment production. In addition, the course covers garment inspection techniques to ensure quality standards at various stages of production. Students will learn about inspection methods, defect identification, and quality control measures essential for meeting buyer expectations and industry norms. To provide a holistic understanding of the apparel business, the course also introduces basic concepts of apparel merchandising. This includes coordination between production and marketing, buyer communication, order execution, and the role of merchandisers in meeting delivery schedules and maintaining product quality. Overall, this course aims to equip students with the technical competencies and industry-relevant knowledge necessary to excel in modern apparel manufacturing environments.</p> |



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Course Outcome:

After Completion of the Course, Student will able to:

| No | Course Outcomes | RBT Level |
|----|--|------------------|
| 01 | Select suitable fabric for apparel manufacturing based on end use application. | R, U, A |
| 02 | Select appropriate design pattern, grading methods, marker plan, spreading techniques, and cutting involved in the apparel manufacturing process. | R, U, A, N, E, C |
| 03 | Select suitable sewing needles, threads, feed mechanisms, sewing machines, and seams based on fabric characteristics for apparel manufacturing. | R, U, A |
| 04 | Incorporate suitable fusing technologies, CAD/CAM methods, computerized grading, marker planning, and cutting processes for apparel manufacturing. | R, U, A |
| 05 | Examine garment quality at various stages of garment inspection. | U, A, N, E |

*Revised Bloom's Taxonomy (RBT)

Teaching and Examination Scheme:

| Teaching Scheme (in Hours) | | | Total Credits L+T+ (PR/2) | Assessment Pattern and Marks | | | | Total Marks |
|-------------------------------|---|----|------------------------------------|------------------------------|-------|----------------------|---------|----------------|
| L | T | PR | C | Theory | | Tutorial / Practical | | |
| | | | | ESE (E) | PA(M) | PA(I) | ESE (V) | |
| 3 | 0 | 0 | 3 | 70 | 30 | 00 | 00 | 100 |

Course Content:

| Unit No. | Content | No. of Hours | % of Weightage |
|---|--|-----------------|-------------------|
| 1. Introduction to Apparel Manufacturing | 1.1 Overview of Indian Apparel industry. 1.2 Differentiate between Ready-made garments (RMG) and tailor-made garments. 1.3 Factors affecting selection of fabrics in apparel manufacturing. 1.4 Different stages of apparel manufacturing process. 1.5 Fabric grading. 1.6 Grey Fabric inspection method. 1.7 Fabric grading system (four point and ten point system) 1.8 Body Measurement System (2D and 3D system). 1.9 Size chart and its classification. | 7 | 16 |



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| 2. Sample Making, Marker Planning, Spreading, and Cutting Process | 2.1 Pattern design. 2.2 Sizing. 2.3 Pattern grading. 2.4 Sample making. 2.5 Marker planning process <ul style="list-style-type: none"> • Objectives of marker planning. • Requirements of marker planning. • Efficiency of marker plan. • Types of marker planning based on fabric laying (half garment lay, whole garment lay, single size lay, multi size lay). • Methods of marker planning (manual and automatic/computerized). 2.6 Spreading process <ul style="list-style-type: none"> • Objectives of spreading process. • Requirements of spreading. • Methods of spreading (manual, semi-automatic, automatic). • Modes of spreading based on nap and face direction. 2.7 Cutting process <ul style="list-style-type: none"> • Objectives of cutting process. • Methods of cutting (manual, semi-automatic, automatic). • Factors affecting cutting process. • Different fabric cutting tools and their features (scissors, straight knife cutter, round knife cutter, die cutter, band knife cutter, laser cutter, water jet cutter, ultrasonic cutter). • Position markers (drill, notch). | 18 | 40 |
| 3. Sewing Process | 3.1 Objectives of sewing process. 3.2 Properties of seams. 3.3 Types of seams, their construction, features and applications. 3.4 Types of stitches. 3.5 Construction and working of a basic sewing machine and the functions performed by its important parts. 3.6 Sewing machine work aids. 3.7 Functions of the components of the feed system (feed dog, pressure foot, and needle/throat plate). | 10 | 22 |



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| | 3.8 Brief study of different types of feed mechanisms used in sewing machine and their features. 3.9 Different defects arise during sewing process. 3.10 Test methods to examine quality of seam. 3.11 Different types of sewing threads and their features. 3.12 Different parts of a sewing needle, different types of sewing needles and their features. | | |
| 4. Fusing and CAD/CAM | 4.1 Objectives of Fusing Process. 4.2 Requirement of Fusing process. 4.3 Different Fusing methods. 4.4 Differentiate between manual apparel manufacturing process and CAD/CAM based apparel manufacturing. 4.5 Advantages of CAD/CAM system in apparel manufacturing. 4.6 Features of computerized grading, marker planning and cutting process in apparel manufacturing. | 6 | 13 |
| 5. Garment Inspection and Merchandising | 5.1 Distinguish between intrinsic and extrinsic parameters of garment. 5.2 Basics of garment inspection process. 5.3 Stages of various garment finishing processes. 5.4 Process flow chart of apparel merchandising. 5.5 Merchandising: type of Merchandiser, responsibilities of merchandisers, modern retailing by Merchandiser. | 4 | 09 |
| | Total | 45 | 100 |

Suggested Specification Table with Marks (Theory):

| Distribution of Theory Marks (in %) | | | | | |
|-------------------------------------|---------|---------|---------|---------|---------|
| R Level | U Level | A Level | N Level | E Level | C Level |
| 30 | 30 | 20 | 10 | 5 | 5 |

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Garment Manufacturing Technology, Edited by Rajkishore Nayak and Rajiv Padhye, Woodhead Publishing, Year 2015, ISBN: 978-1-78242-232-7.
2. Stitches and Seams, RM Liang and J Webster, Year 1998, ISBN 1870812735.



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3. Introduction to Clothing Manufacture, Gerry Cooklin, Steven George Hayes, John McLoughlin, 2nd Edition, Blackwell publishing, Year 2006, ISBN: 978-0-632-05846-4.
4. Design of Clothing Manufacturing Processes, A Systematic Approach to Developing, Planning, and Control, Author Jelka Geršak, 2nd Edition, Woodhead Publishing, Year 2022, ISBN: 978-0-08-102648-9.
5. Carr and Latham's Technology of Clothing Manufacture, 4th Edition, Edited by David J. Tyler, Year 2008, Wiley-Blackwell, ISBN: 978-1-405-16198-5.

(b) Open source software and website:

1. <https://textilelearner.net/>
2. <https://www.fibre2fashion.com/>
3. <https://nptel.ac.in/>
4. <https://www.textileassociationindia.org/jta-archives>
5. <https://or.niscpr.res.in/index.php/IJFTR>
6. https://www.youtube.com/watch?v=WDvbS1StLg4&t=19s&ab_channel=Vidya-mitra

List of Laboratory/Learning Resources Required:

1. Scissors and Shears.
2. Straight knife cutter with attached motor.
3. Round knife cutter with attached motor.
4. Lockstitch Sewing machine.
5. Spreading table.
6. CAD software for pattern engineering, grading and marker planning.

Suggested Project List:

1. Study the parameters related to fabric selection for apparel manufacturing and prepare a report.
2. Prepare a miniature marker plan and grading for different types of garments.
3. Prepare a detailed report on different cutting machine their features.
4. Prepare a report on sewing machine and sewing quality process parameters.
5. Study the parameters related to role of garment analysis and prepare compile report.

Suggested Activities for Students:

1. Prepare a chart showing different fabric selection criteria for apparel manufacturing.
2. Prepare marker plan for different types of Garments.
3. Prepare a chart illustrating different types of seams and stitches.



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4. Present a seminar on any relevant topic of apparel manufacturing.
5. Explore library/internet to understand production technologies being used for apparel manufacturing and prepare a report.
6. Prepare showcase portfolios of various cutting, spreading, and sewing machine.
7. Internet survey regarding uses of different sewing work aids used in apparel industry.

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